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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/542,779	12/29/2005	Takashi Kawasaki	275597US0PCT	8868
22850	7590	01/08/2008	EXAMINER	
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C.			BAREFORD, KATHERINE A	
1940 DUKE STREET				
ALEXANDRIA, VA 22314			ART UNIT	PAPER NUMBER
			1792	
			NOTIFICATION DATE	DELIVERY MODE
			01/08/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	10/542,779	KAWASAKI ET AL.
	<b>Examiner</b>	<b>Art Unit</b>
	Katherine A. Bareford	1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 30 November 2007.
- 2a) This action is FINAL.                            2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-10 is/are pending in the application.
  - 4a) Of the above claim(s) 7-10 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-5 is/are rejected.
- 7) Claim(s) 6 is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.
 

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 7/05/12/07.
- 4) Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) Notice of Informal Patent Application
- 6) Other: \_\_\_\_\_.

**DETAILED ACTION**

***Election/Restrictions***

1. Applicant's election with traverse of Group I, claims 1-6 in the reply filed on November 30, 2007 is acknowledged. The traversal is on the ground(s) that (1) no adequate reasons and/or examples have been provided to support a conclusion of patentable distinctiveness, (2) it has not been shown that a burden exists, (3) and that no lack of unity was made in the International Search Report for the PCT application upon which the present application is based. This is not found persuasive because (1) as to examples, in the restriction requirement of October 31, 2007 specific reasons were cited and applicant as provided no reasons why these reasons are improper. Furthermore, the Examiner notes the rejection in the 35 USC 103 rejection below also indicating that the cited technical feature is not a contribution over the prior art. (2) As to a burden on the Examiner, if both inventions were searched, the Examiner would have to consider each piece of possible prior art under two different standards for the two different inventions, and this would place a serious burden on the Examiner. (3) As to the lack of unity not being made in the International Search Report, there is no requirement that lack of unity must be made in the International Search Report before there can be a lack of unity made in the national stage application.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 7-10 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on November 30, 2007.

*Specification*

3. The abstract of the disclosure is objected to because the abstract should be in the form of one paragraph rather than two.

Correction is required. See MPEP § 608.01(b).

*Claim Objections*

4. Claim 6 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from another multiple dependent claim (claim 3 is also multiple dependent, and claim 6 also depends from claim 3 and is multiple dependent). See MPEP § 608.01(n).

Accordingly, claim 6 has not been further treated on the merits.

*Claim Rejections - 35 USC § 112*

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the

art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 1-2 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the use of calcium aluminate wherein the main mineral phase is crystalline  $12\text{CaO}\cdot7\text{Al}_2\text{O}_3$  (as described in claim 3), does not reasonably provide enablement for use of any oxygen radical containing calcium aluminate in general. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.

As described in the specification at page 8, lines 17-26, the described invention must use  $12\text{CaO}\cdot7\text{Al}_2\text{O}_3$  ( $\text{C}_{12}\text{A}_7$ ), and that only  $12\text{CaO}\cdot7\text{Al}_2\text{O}_3$  ( $\text{C}_{12}\text{A}_7$ ) has the nature to provide the claimed oxygen radical content of claim 2.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1-5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1-5 provide forming a calcium aluminate film by thermal spraying, but there is no indication that the thermal spraying is onto a substrate, so it is unclear if a

film is intended to be formed on a substrate or whether an independent article consisting only of the film is intended to be formed.

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hosono et al (US 2002/0172726) in view of Kuo et al (US 5391440).

Hosono teaches a method of forming an oxygen radical containing calcium aluminate material. Paragraphs [0001] and [0011]. The formed material can be used as

an oxidization catalyst, an antibacterial material or an electrode material for solid-oxide fuel cells. Paragraphs [0041] – [0042].

Claim 2: the oxygen radical content in the calcium aluminate can be at least  $10^{20}$  cm<sup>-3</sup>. Paragraphs [0010] and [0038] and Table 1.

Claim 3: the main mineral phase of the calcium aluminate is crystalline  
 $12\text{CaO} \cdot 7\text{Al}_2\text{O}_3$  (C<sub>12</sub>A<sub>7</sub>). Paragraphs [0010] and [0022].

Claim 4: the  $12\text{CaO} \cdot 7\text{Al}_2\text{O}_3$  (C<sub>12</sub>A<sub>7</sub>) is obtained by a solid phase reaction of a Ca source and an Al source. Paragraphs [0010] – [0011]. The atomic equivalent ratio of calcium and aluminum is approximately 12:14 (0.86:1). Paragraph [0010].

Claim 5: the solid phase reaction is carried out in a dry oxidizing atmosphere with an oxygen partial pressure of at least  $10^4$  Pa and a water vapor (steam) partial pressure of  $10^2$  Pa or less and a temperature of 1200-1415 degrees C. Paragraphs [0011]-[0012].

Hosono teaches all the features of these claims except (1) the thermal spraying of the powder of the calcium aluminate material and (2) the mol ratio of Ca:Al range (claim 4).

However, Kuo teaches forming a solid oxide electrochemical (fuel) cell. Column 1, lines 15-25. Kuo teaches to plasma (thermal) spray a flux added interconnection powder on to an electrode. Column 1, lines 10-25. The plasma sprayed interconnection powder includes a mixture of lanthanum chromite particles and flux particles, where

the flux is preferably calcium aluminate ( $(\text{CaO})_{12}(\text{Al}_2\text{O}_3)_7$ , which would be  $12\text{CaO}\cdot7\text{Al}_2\text{O}_3$ ). Column 9, lines 1-10 and column 12, lines 15-40.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Hosono to provide the oxygen radical containing calcium aluminate material in the form of a powder and to thermal spray this powder to form layers in solid oxide fuel cell structures as suggested by Kuo in order to provide a desirable calcium aluminate material for solid oxide fuel cells, because Hosono teaches to provide an oxygen radical containing calcium aluminate material that would be a desirable electrode material for solid oxide fuel cells, and Kuo teaches the known desire to plasma spray powders of calcium aluminate in the  $12\text{CaO}\cdot7\text{Al}_2\text{O}_3$  form to help make layers for solid oxide fuel cells. Thus, it would be suggested to one of ordinary skill in the art to either (1) use the oxygen radical containing calcium aluminate material of Hosono as the flux material of Kuo, since Hosono teaches that the oxygen radical containing calcium aluminate material is especially desirable or (2) actually use the oxygen radical containing material of Hosono as the electrode material itself, as Hosono teaches that it is a desirable electrode material for solid oxide fuel cells and to apply this material by plasma spraying it in powder form, as Kuo teaches that this is a well known method of applying layers of calcium aluminate in the  $12\text{CaO}\cdot7\text{Al}_2\text{O}_3$  form. It further would have been obvious to modify Hosono in view of Kuo to use a mol ratio of Ca:Al within the claimed range of claim 4 as suggested by Hosono in order to provide a

desirable ratio of materials, because Hosono teaches to use an atomic equivalent ratio of Ca:Al of approximately 12:14 (or 0.86:1), and one of ordinary skill in the art would understand that the atomic equivalent ratio of Ca:Al would be equivalent to the mol ratio of Ca:Al as elements are used and therefore "atoms" are measured by both ratios, and 0.86 is within the claimed mol ratio range.

12. Arima et al (US 5480438) teaches to use plasma sprayed calcium aluminate material in plasma sprayed layers for bioactive layers for surgical implants. See column 3, lines 1-15 and 45-65.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) with the First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone numbers for the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and for After Final communications.

Other inquiries can be directed to the Tech Center 1700 telephone number at (571) 272-1700.

Furthermore, information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

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you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



KATHERINE BAREFORD  
PRIMARY EXAMINER